COMBINATION OF TWO FRUIT FLY CONTROL METHODS, COMPONENTS OF THE "IPM PACKAGE" OF THE REGIONAL FRUIT FLY CONTROL PROGRAM IN WEST AFRICA (WAFFI)

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Background

Mango (*Mangifera indica*) production in West Africa has suffered from fruit fly infestation for decades (Ph. 1). Until now, no single control method for fruit flies has been able to guarantee sustainable control. It is therefore crucial to introduce a combination of effective and efficient methods. In that context we have assessed effectiveness of combination of orchard sanitation and spinosad bait sprays (GF120), in comparison with GF120 used alone. The study is in the frame of West African Fruit Fly Initiative (**WAFFI**) that is developing and promoting area wide fruit fly management in West Africa.

Photo 1: Mango fruits infested by fruit flies

Photo 2: a) Collect of fallen fruits sealed in black plastic bag and left in the sun; b) Spinosad bait sprays c) Detection trapping

Materials & Methods

•Fifteen orchards were selected in 5 villages in the Borgou department (north Benin). Per village: one orchard treated with combined methods, one with GF120 only and one untreated.

•Orchard sanitation consisting in (i) gathering punctured or fallen fruits in black plastic bags (Ph. 2a); (ii) sealing the bags and exposed them to direct sunlight for 48 hours, to kill eggs and larvae of Tephritidae (Vayssières et al., 2009 a).

•Spinosad bait sprays (Ph. 2b) every week over 1 m² of the foliage with a freshly mixture during 8 consecutive weeks (Vayssières et al., 2009 b).

• Fly detection trapping done with parapheromone traps (Ph. 2c).

• Effectiveness of treatments:

=> Infestation rates were assessed by sampling and incubating fruits three times from the middle to the end of the mango season (Ph. 3).

Photo 3: Fruit incubation

Results

•The two main mango fruit fly pests are *Ceratitis cosyra* and *Bactrocera invadens*, an invasive species recently spread throughout West Africa.

•*C. cosyra* had the earliest peak of abundance and *B. invadens* quickly increased from the onset of the rains (mid May). Mean number of FTW was not significantly different among treatments (Fig. 1).

•The lowest infestation rate of 1 pupae/kg of fruit was found in the orchards treated with combined methods (Tab. 1).

•Damage reductions as a result of the combined treatments were between 77% and 96% compared to 55% and 75% for GF-120 alone.

Table 1: Comparison of infestation rates (season 2009)

	Treatments		
	Untreated orchards	Treated orchards: GF120 alone	Treated orchards : GF120 + Sanitation
Infestation rates (No pupae / Kg of fruit)	23.6 ± 1.95 a	4.3 ± 0.78 b	1.1 ± 0.31 c
Treatment impact on infestation rates as compared to the control (%)	-	82	95

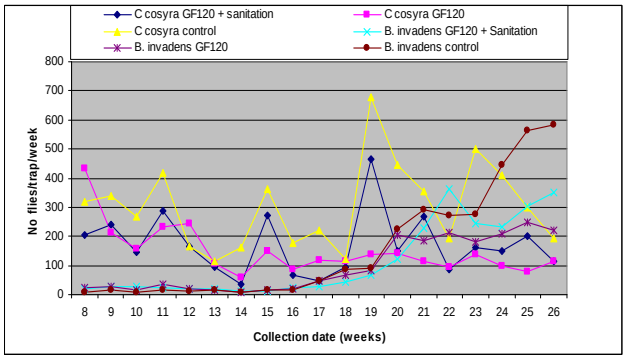

Figure 1: Comparison of male fluctuations of populations of *C. cosyra* and *B. invadens* / trap / week (season 2009)

Discussion

•Getting fruit infestation rates by monitoring sampled individual fruits is an accurate method for assessing the effectiveness of control methods.

•The combination of orchard sanitation with spinosad bait sprays (GF-120) resulted in an effective fly control.

•The study of its cost-benefit returns and influence on fruit flies natural enemies will be essential for its inclusion in the IPM package.

References

-Vayssières J.F., Sinzogan A., Adandonon A. 2009a. Control of fruit flies through phytosanitary hygiene of orchards: prophylactic method. WAFFI- IITA/CIRAD. 4p

- Vayssières J.F., Sinzogan A., Korie S., Ouagoussounon I., Thomas-Odjo A. 2009b. Effectiveness of spinosad bait sprays (GF-120) in controlling mango-infesting fruit flies (Diptera: Tephritidae) in Benin. *Journal of Economic Entomology*, 102, 515-521.

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